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Memorandum

To: **LaDonna Turner, Site Assessment Manager**
Technical and Enforcement Branch
U.S. Environmental Protection Agency, Region 6

From: **Dana Bahar, Manager, Superfund Oversight Section**
Ground Water Quality Bureau, New Mexico Environment Department

Date: **August 16, 2010**

Subject: **Pre-CERCLIS Screening Assessment of the Hogan mine (Grants Mining District), McKinley County, New Mexico: Further action under CERCLA recommended**

Site name Hogan mine **Alternative names** Lucky Dooley, Fence, Plain, Section 14
Street address not applicable **City** not applicable **State** New Mexico
Zip code not applicable **County** McKinley
Latitude 35.352386 **Longitude** -107.758699 **TRS** T13N, R9W, s. 14SE

Site physical description:
The Hogan minesite ("Site") is located approximately 200 feet ("ft") north of State highway 605, approximately 1.5 miles east of Ambrosia Lake junction (Ref. 1, p. 69). A 2007 survey performed by a contractor to the New Mexico Energy, Minerals, and Natural Resources Department ("NMEMNRD") identified an open shaft, several areas of concrete (see P3) and 2 supports for the headframe.

A reconnaissance performed by personnel from the New Mexico Environment Department ("NMED") and NMENNRD on July 26, 2010 identified the same features. The shaft is fenced and covered by crumbling concrete that has been poured over railroad track sections placed over the opening (see P1). Numerous small piles of waste or bulldozed materials are scattered around the Site. Additionally, several sections of rusted iron pipe were observed close to the shaft location (see P2).

The residence and associated well of the property owner, (b) (6) [redacted], is located

approximately 1000 feet ("ft") north of the Site.

Site identification:
The Site is one of numerous legacy uranium sites within the Grants Mining District.

Site summary:
The mine was developed in the Poison Canyon sandstone through a 340 ft deep vertical shaft. The ore deposit, while not large, is one of the higher grade deposits in the area (Ref. 1, p. 69). Dewatering was required for production (Ref. 2). During operation, 378,510 pounds of uranium oxide was produced from 129,551 tons of ore, at an average grade of 0.26% (Ref. 3). A reinforced 10 to 15 ft thick concrete slab was placed over the shaft, which was not backfilled in anticipation of possible future development (Ref. 1, p. 69).

During the 2007 survey, waste rock radioactivity was measured to be 5000 counts per minute ("cpm") both on contact and at an elevation of 1 meter. Another reading taken approximately 200 ft to the northwest recorded 5100 cpm on contact, and 2400 cpm at an elevation of 1 meter. Radioactivity at the shaft was measured at 5000 cpm at contact, and 15,000 cpm at one meter elevation. No background readings were identified in this survey (Ref. 4).

Targets:
Potential impacts to the alluvial ground water system during Site operation may have occurred from ground water discharges from mine workings to settling ponds and ultimately to the San Mateo Creek drainage. Some portion of discharged contaminants may adhere to sediments, and propagate episodically downgradient in response to streamflows within the San Mateo Creek drainage. Current details of alluvial ground water flow are unknown, but are thought to follow general topographic slope (i.e., locally southward from the Site, and generally westward in the direction of surface water flow). Such alluvial ground water impacts may also propagate into underlying bedrock aquifers through stratigraphic, structural, and/or anthropogenic (e.g., leaky wells, mine shafts) interconnections. Additional contaminant mobilization in ore-bearing Westwater Canyon Formation could result from oxygenated ground water influx resulting from progressive basin recharge following cessation of mining activities.

Additional Site-originated impacts may have occurred from wastes remaining on-site. A residential well, which belongs to the property surface owner, (b) (6) [redacted], is located approximately 1000 ft to the south. This well was installed in 1978 to a depth of 383 ft (Ref. 5). The location of this well appears to be coincident with that recorded for well B-0456 that is discussed below.

Well records from the New Mexico Office of the State Engineer that are located within a four-mile radius of the Site are shown in the table following (Ref. 6). The Site is located within 2900 ft of San Mateo Creek.

Distance from Site (miles)	OSE record number	Owner's first name	Owner's last name	use	finish date	depth well (ft)	depth to water (ft)	casing diameter (in.)	yield (gpm)
0 – 0.25	B 01104	(b) (6)		DOM	04/02/1986	303	247	4.0	12.0
0.25 – 0.50	B 00456	(b) (6)		STK		0	0		
0.5 – 1.0	B 00415		NEW MEXICO E.I.A.	DOM	08/10/1977	95	72	5.0	2.0
	B 00415		NEW MEXICO E.I.A.	DOM	08/11/1977	90	73	5.0	10.0
	B 00415		NEW MEXICO E.I.A.	DOM	08/12/1977	80	74	5.0	1.0
1.0 – 2.0	B 00659	(b) (6)		DOM	01/18/1979	220	190		15.0
	B 00861			DOM		0	0		
	B 01115			DOM	07/21/1986	478	204	4.0	30.0
	B 01190			STK	08/31/1989	390	37		15.0
	B 01544			DOM	06/14/2003	715	624	5.0	6.0
	B 01636			DOM	05/10/2005	260	80	4.0	5.0
2.0 – 3.0	B 00390		FERNANDEZ CO. LTD	IRR	12/31/1974	1800	900	6.63	850.0
	B 00558		N.M. STATE HWY DEPT.	PUB		0	0		
	B 00997	(b) (6)		MUL		0	0		
3.0 – 4.0	B 00414		RESERVE OIL & MINERALS CORP	SAN		0	0		
	B 00415		NEW MEXICO E.I.A.	DOM	08/30/1977	59	30		
	B 00415		NEW MEXICO E.I.A.	DOM	08/30/1977	59	30	5.0	4.0
	B 00415		NEW MEXICO E.I.A.	DOM	08/30/1977	72	30	5.0	12.0
	B 00415		NEW MEXICO E.I.A.	DOM	08/30/1977	54	30	5.0	5.0
	B 00415		NEW MEXICO E.I.A.	DOM	08/30/1977	57	32	5.0	8.0
	B 00848		KERR-MCGEE NUCLEAR CORP.	MIN		0	0		
	B 00848		KERR-MCGEE NUCLEAR CORP.	MIN	05/14/1981	1611	1315	4.5	
	B 00848		KERR-MCGEE NUCLEAR CORP.	MIN		0	0		
	B 00851		KERR-MCGEE NUCLEAR CORP	DEW		0	0		
	B 01084		FERNANDEZ COMPANY	STK	01/01/1963	320	60		

DOM -- 72-12-1 DOMESTIC ONE HOUSEHOLD
DEW -- DEWATERING WELL
IRR -- IRRIGATION
MIN -- MINING OR MILLING OR OIL
MUL -- 72-12-1 MULTIPLE DOMESTIC HOUSEHOLDS
PUB -- 72-12-1 CONSTRUCTION OF PUBLIC WORKS
SAN -- 72-12-1 SANITARY IN CONJUNCTION WITH A COMMERCIAL USE
STK -- 72-12-1 LIVESTOCK WATERING

Site ownership and Potential Responsible Parties:
The mine was operated by Four Corners Exploration, Inc. between 1959 and 1962; United Western had a small interest in the latter stage of this production. As of 1980, United Nuclear Corporation had assumed the mining claims in this section (Ref. 1, p. 69). Robert Sandoval currently owns the surface rights to the Site, while the U.S. Bureau of Land Management owns the mineral rights (Ref. 7).

File review:
Files that were reviewed for this assessment are listed below.

Site reconnaissance:
Personnel from NMED and NMEMNRD performed a Site reconnaissance on July 26, 2010. All gamma readings shown on the figures accompanying this report were made with a Ludlum 14-C analog scintillometer (serial number 194209) with an uncollimated Ludlum 44-2 gamma detector (serial number PR241278), for which readings are recorded in counts per minute ("cpm"). Contact readings from this instrument ranged from 3000 cpm at locations some distance from the Site shaft to 200,000 cpm on soils near the shaft. The ground surface at the Site was very wet from heavy rainfall that had occurred during days prior to the Site reconnaissance, and additional rain occurred sporadically throughout the day of the Site visit. According to a representative from Ludlum, such environmental conditions could cause readings from the instrument to be higher than would otherwise occur under dry conditions. Additional elevation of readings also may occur due to radioactivity "shine" caused by topographic conditions or nearby radioactive sources.

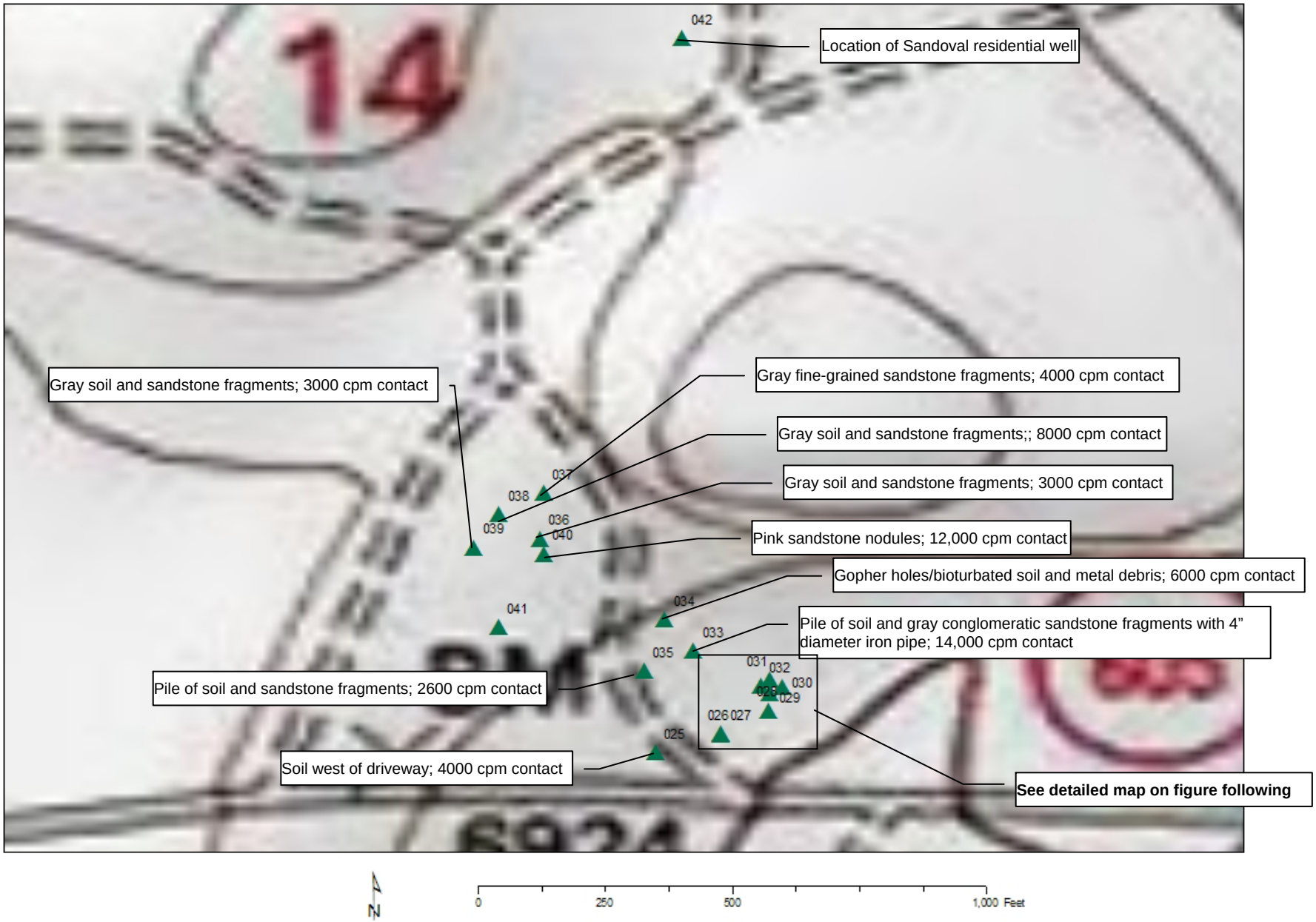
Recommendation:
The Site should be assessed for potential physical hazards, especially the compromised cover of the open shaft, should be assessed and mitigated as soon as possible.

Additional investigation of the Site under CERCLA authority is recommended to assess the areal extent of elevated radioactivity readings noted in the Site reconnaissance to determine if threats to human health and the environment exist. NMED also recommends assessment of sediments in the Site vicinity in order to evaluate the potential occurrence of impacts from dispersal of waste materials that have been left on-Site.

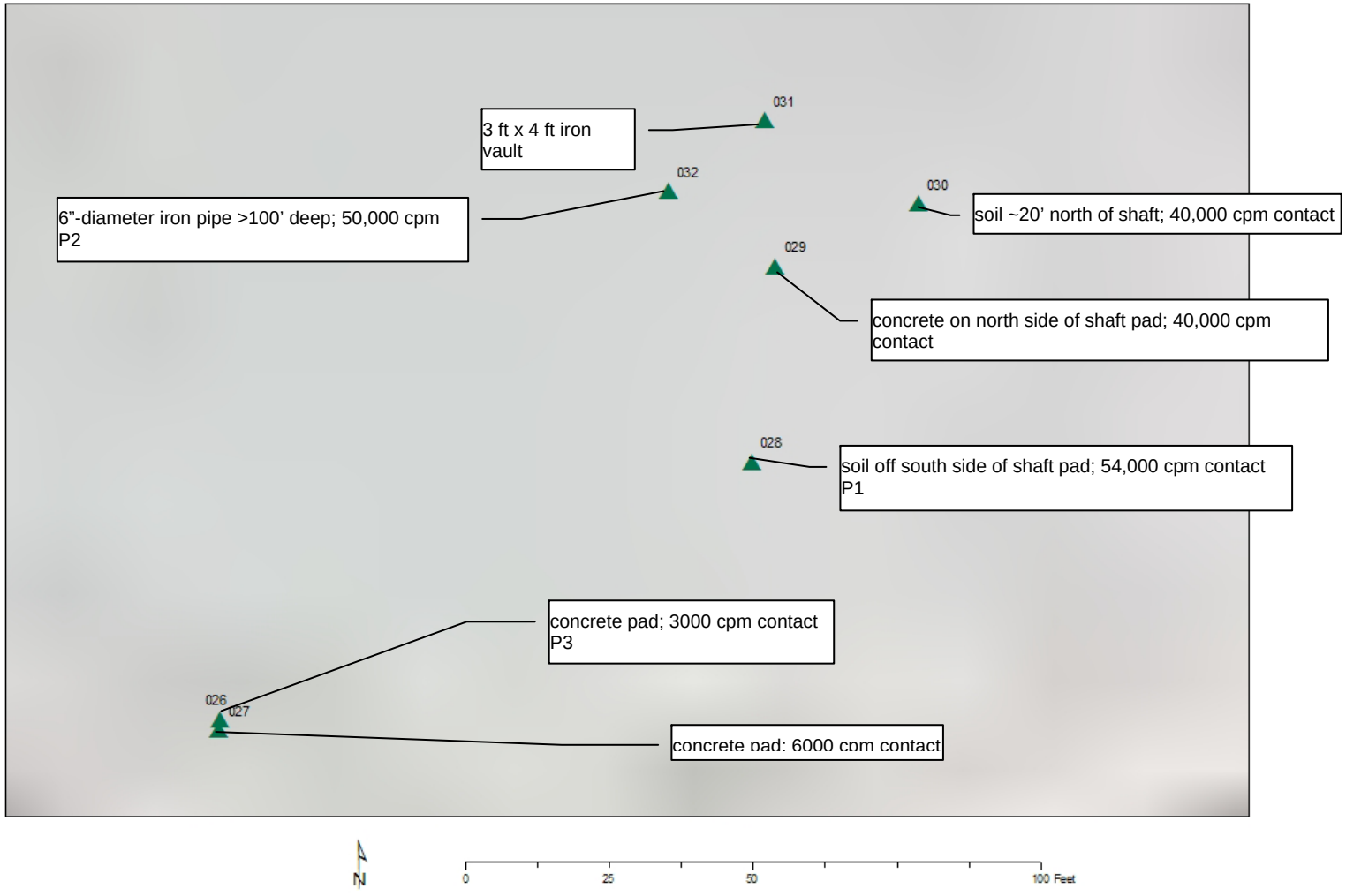
Currently, the existence of regional impacts from legacy uranium sites to the ground water system has not been determined. Ground water had to be pumped from the Hogan mine in order to access the ore deposits, but the location of the effluent discharge is not evident. The bank of SMC near the Site should be surveyed to attempt to determine where the effluent discharge may have been routed; radiological surveying and sediment sampling to depth also is recommended to determine potential impacts to sediments. A generalized investigation of potential alluvial ground water impacts from "wet" former uranium mines within the Grants Mining District is recommended as part of regional ground water quality characterization. If this generalized investigation were to indicate a potential for alluvial ground water impacts, on-Site installation of one or more monitor wells then should be considered.

Data from other former "wet" mines suggest that repressurization of the ore-host rock, following cessation of pumping for mine dewatering, may be causing mobilization of uranium

and associated minerals, and consequent degradation of ground water quality, due to influx of oxygenated ground water. The potential for such impacts, on both regional and site-specific scales, should also be assessed and characterized.



Observations from 07/26/2010 Site reconnaissance of Hogan minesite



Detail of Hogan minesite shaft area

P1: Hogan mine shaft

P2: Rusted pipes near shaft; vertical pipe is greater than 100 ft deep

P3: Concrete pad adjacent to shaft

1. Anderson, Orin J., 1980(?). "Abandoned or inactive uranium mines in New Mexico." New Mexico Bureau of Mines and Mineral Resources Open-file report 148.
2. New Mexico Energy, Minerals, and Natural Resources Department, January 2009. "Production method and surface ownership of abandoned uranium mines (AUM) in relation to water wells: Ambrosia Lake uranium sub-district."
3. McLemore, Virginia T. and William L. Chenoweth, revised December 1991. "Uranium mines and deposits in the Grants district, Cibola and McKinley counties, New Mexico." New Mexico Bureau of Mines and Mineral Resources Open-file report 353.
4. New Mexico Energy, Minerals, and Natural Resources Department, July 28, 2008. Shapefiles from contractor survey.
5. New Mexico Environment Department, July 20, 2008. "Residential well questionnaire" (Robert Sandoval).
6. New Mexico Office of the State Engineer. "May_06_wells." Shapefile.
7. New Mexico Energy, Minerals, and Natural Resources Department, February 3, 2010. "Updates_AUM_table_NW_Ambrosia_Lake 02032010.xls."